A comparison of orbital epithermal neutron datasets

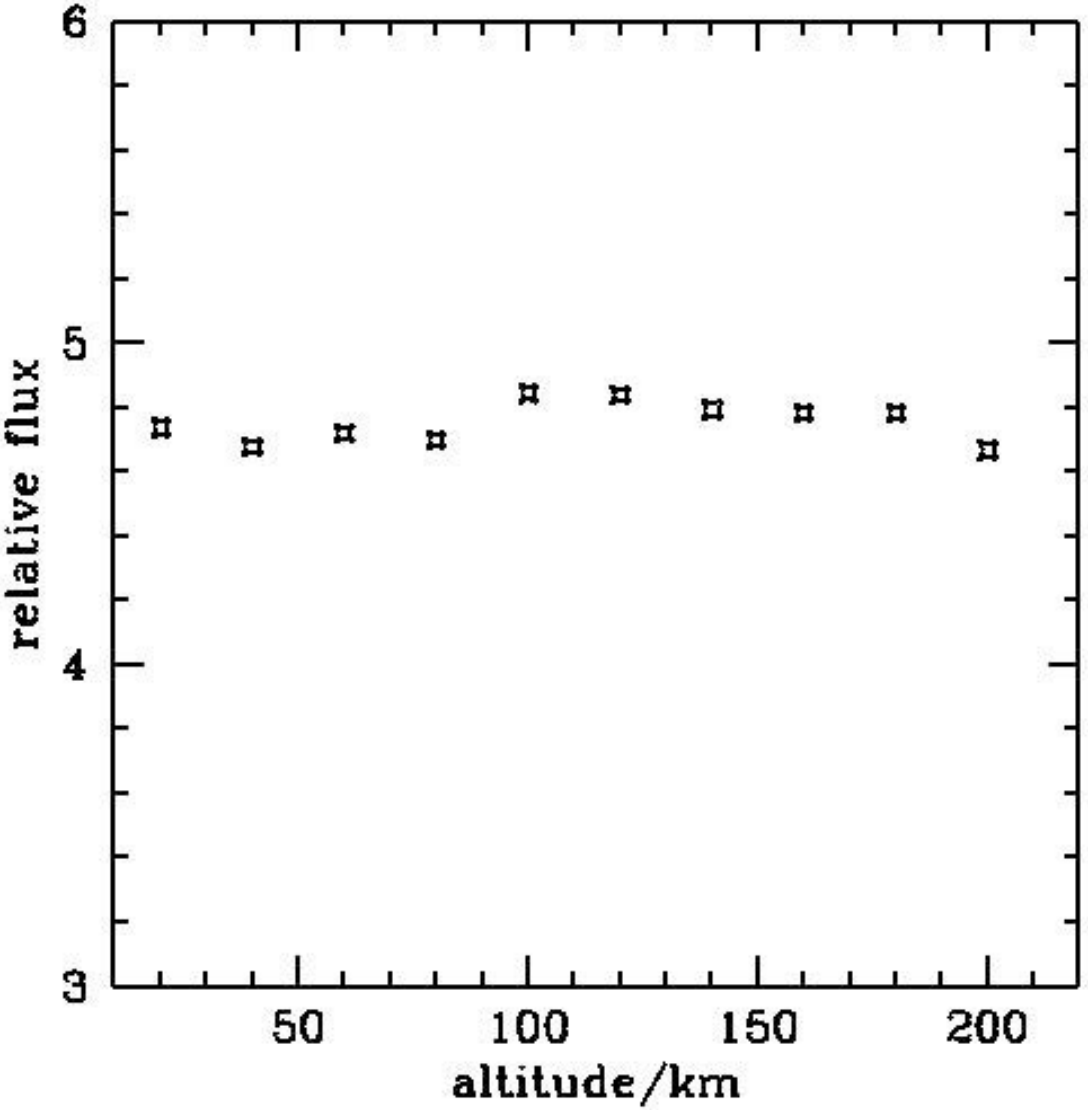
Vincent Eke (ICC, Durham University)

Luis Teodoro (Eloret Corp., NASA Ames) Rick Elphic (NASA Ames)

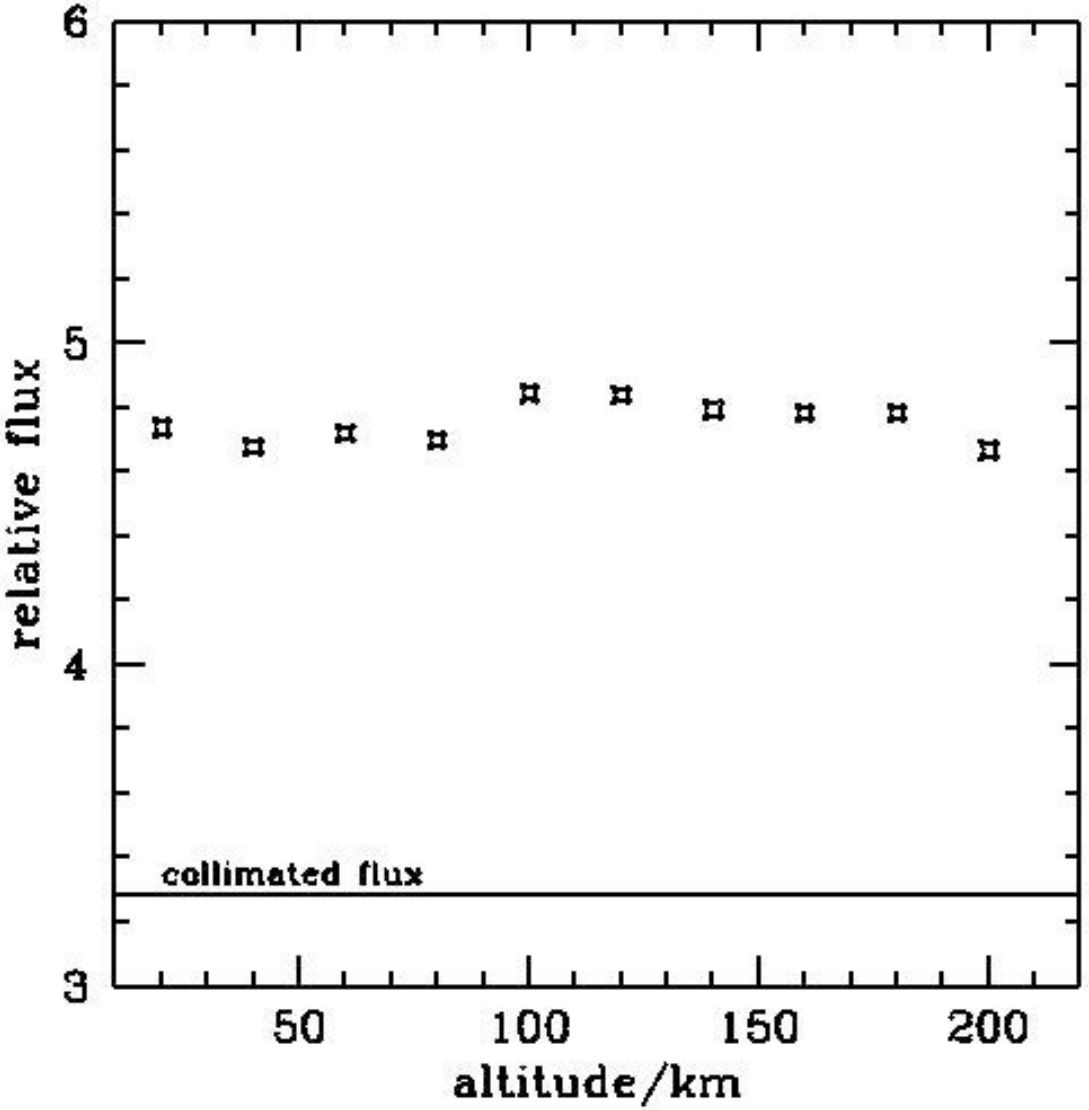
Josh Cahill, David Lawrence (JHU APL)

Bill Feldman, Tom Prettyman (PSI, Tucson)

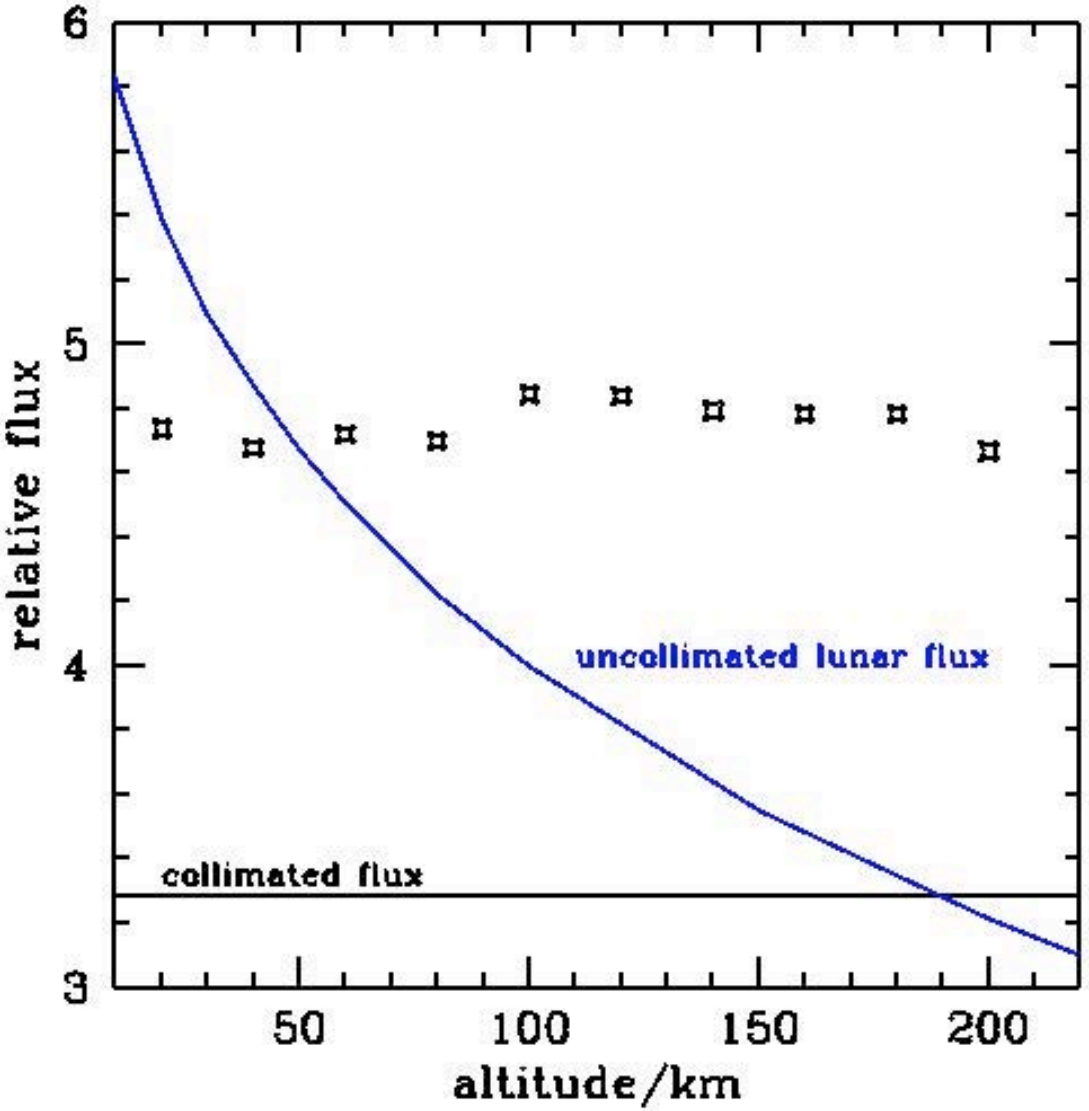
The altitude dependence of the LEND CSETN data



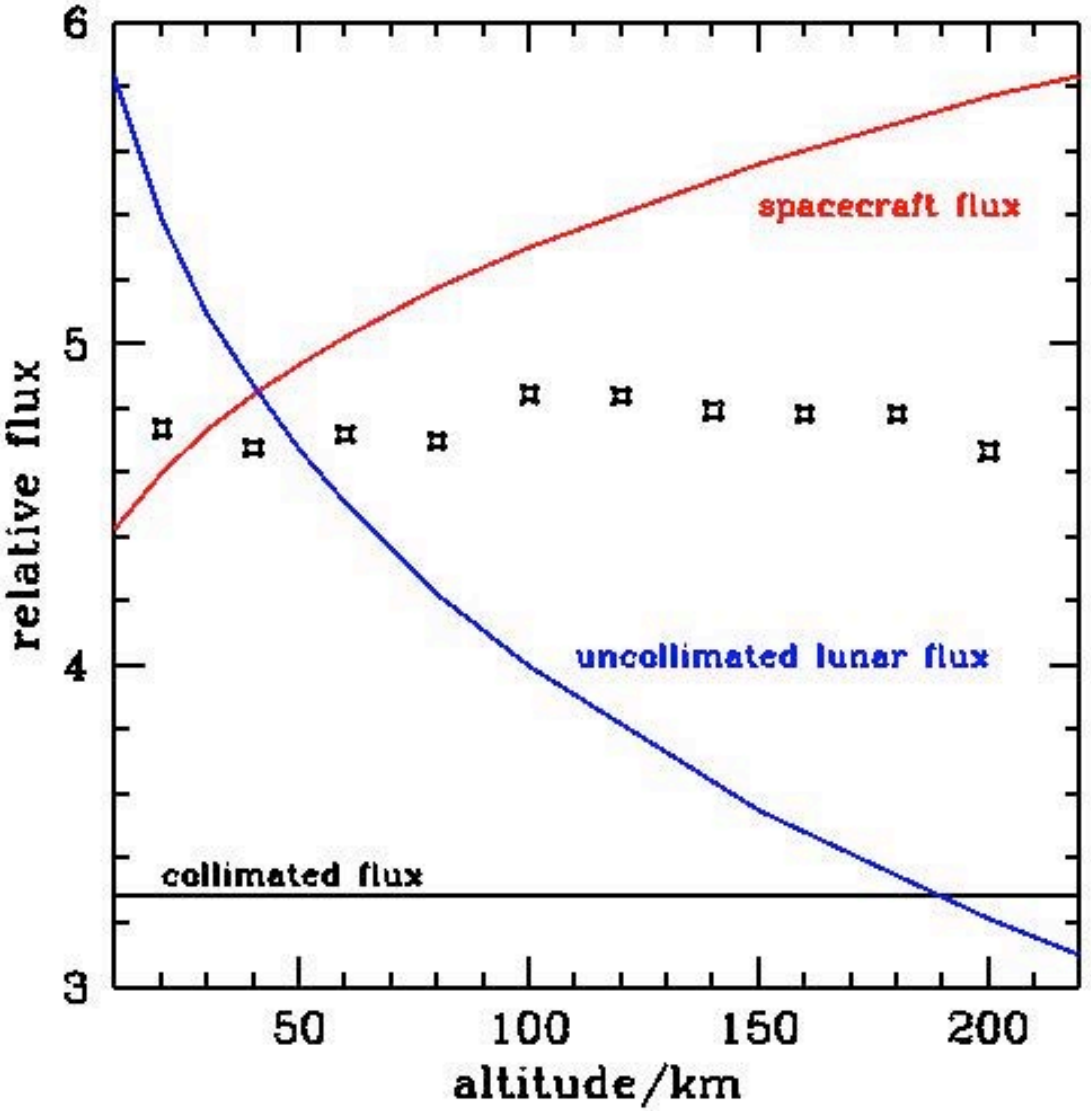
The altitude dependence of the LEND CSETN data



The altitude dependence of the LEND CSETN data



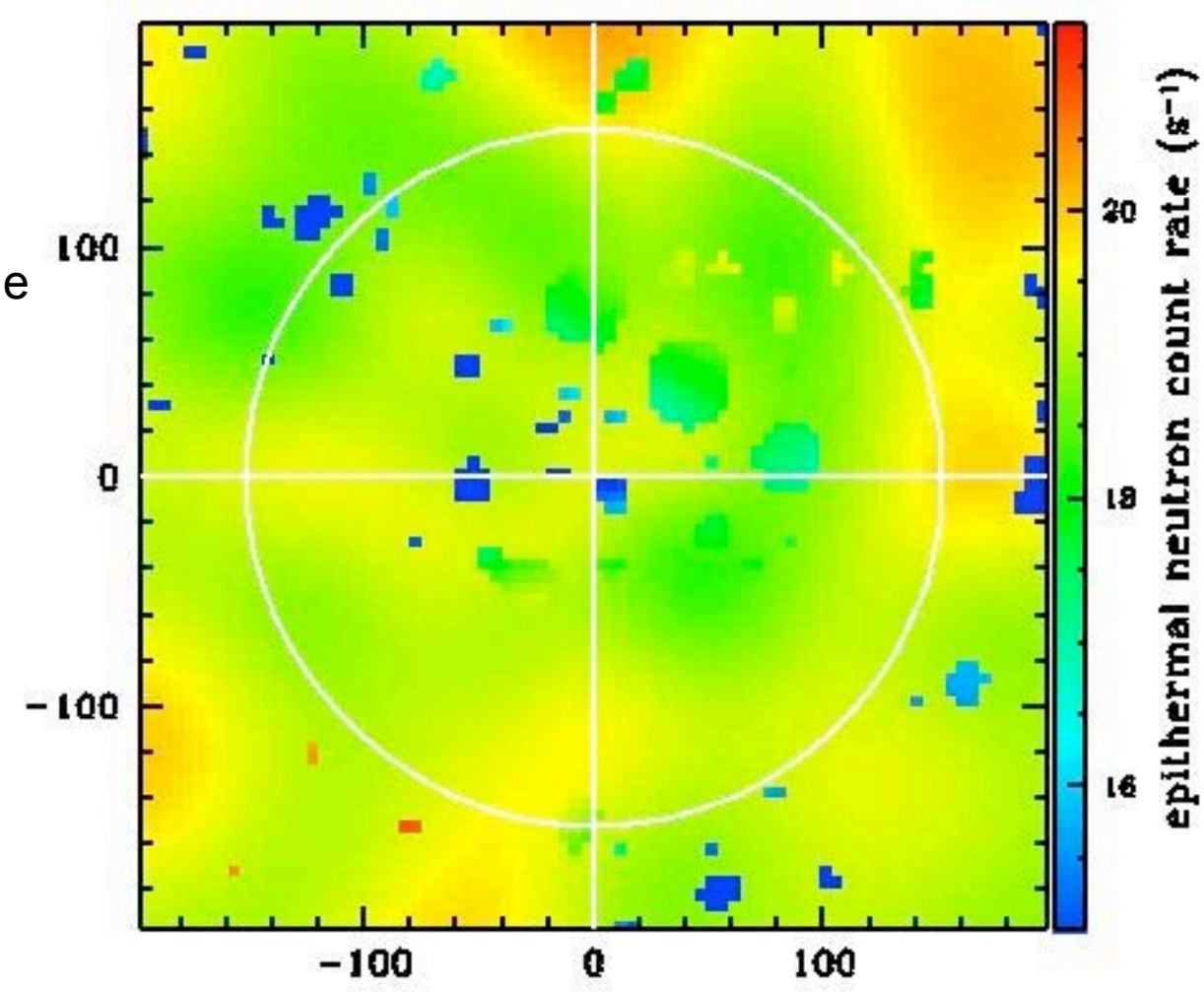
The altitude dependence of the LEND CSETN data



What goes into a measurement?

Teodoro et al, 2010,
GRL, 37, 12201

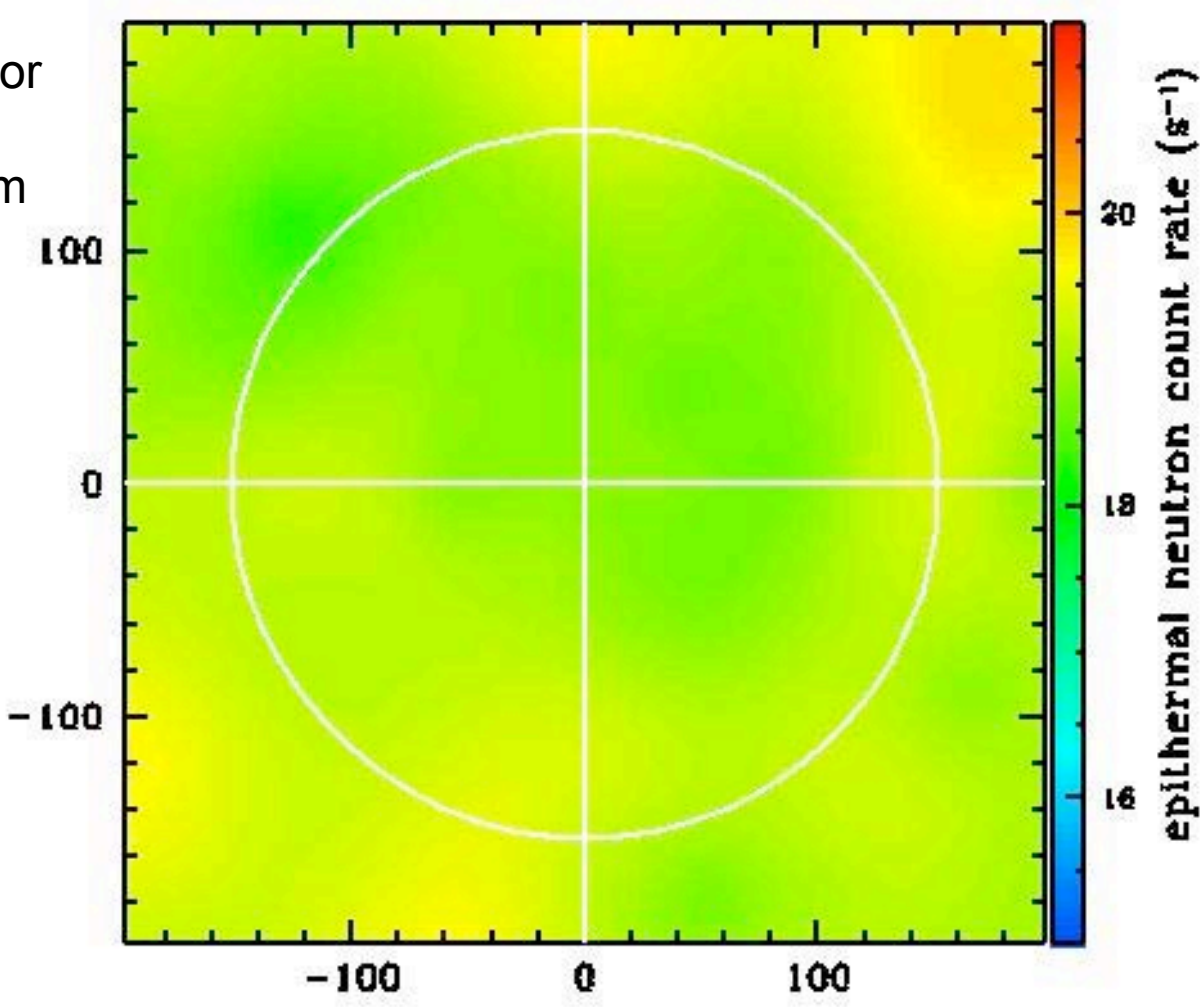
Lunar Prospector
7 months of low-altitude
South Pole data.



What goes into a measurement?

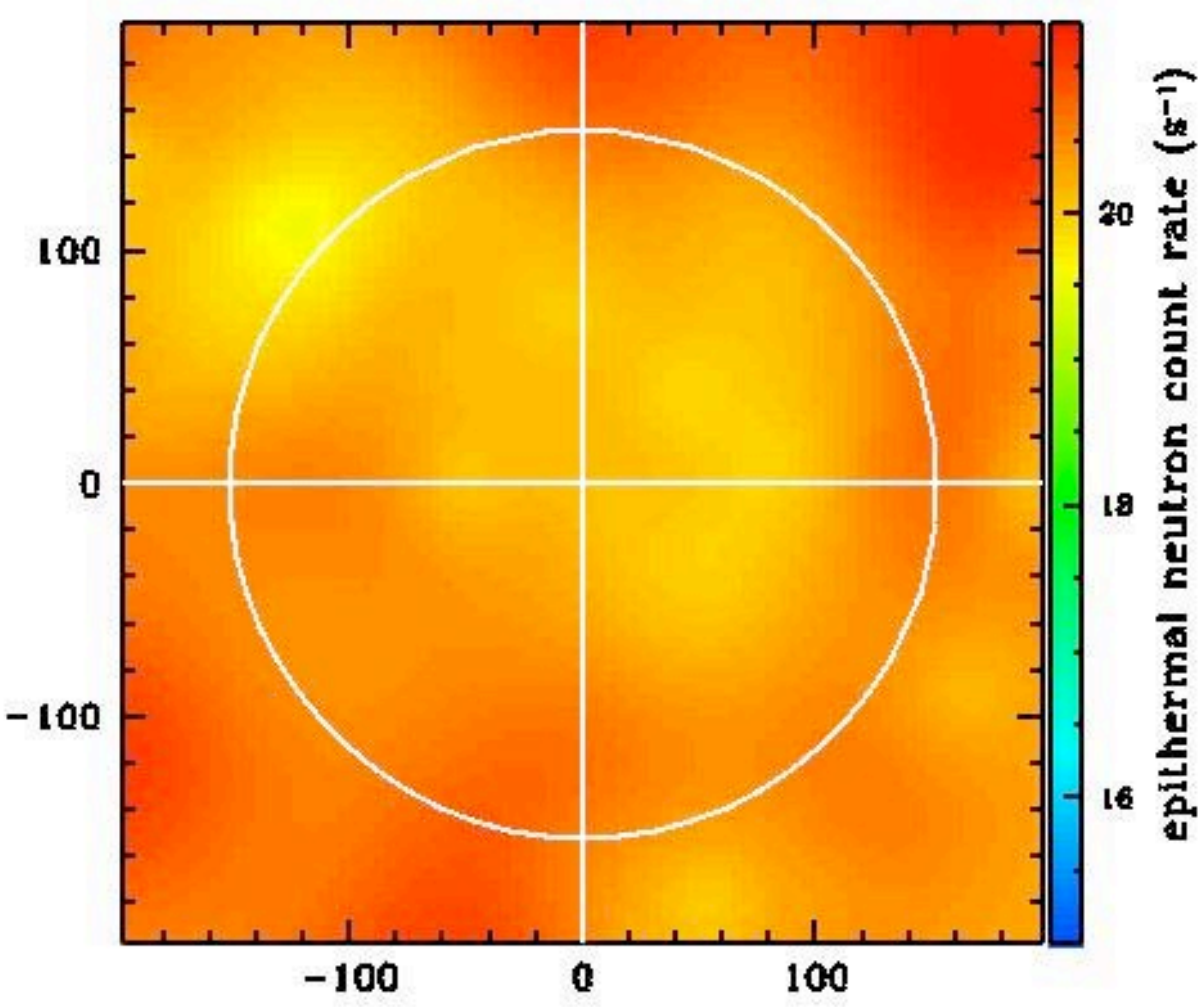
Omni-directional sensor

Effective FWHM~45km
(Maurice et al 2004)



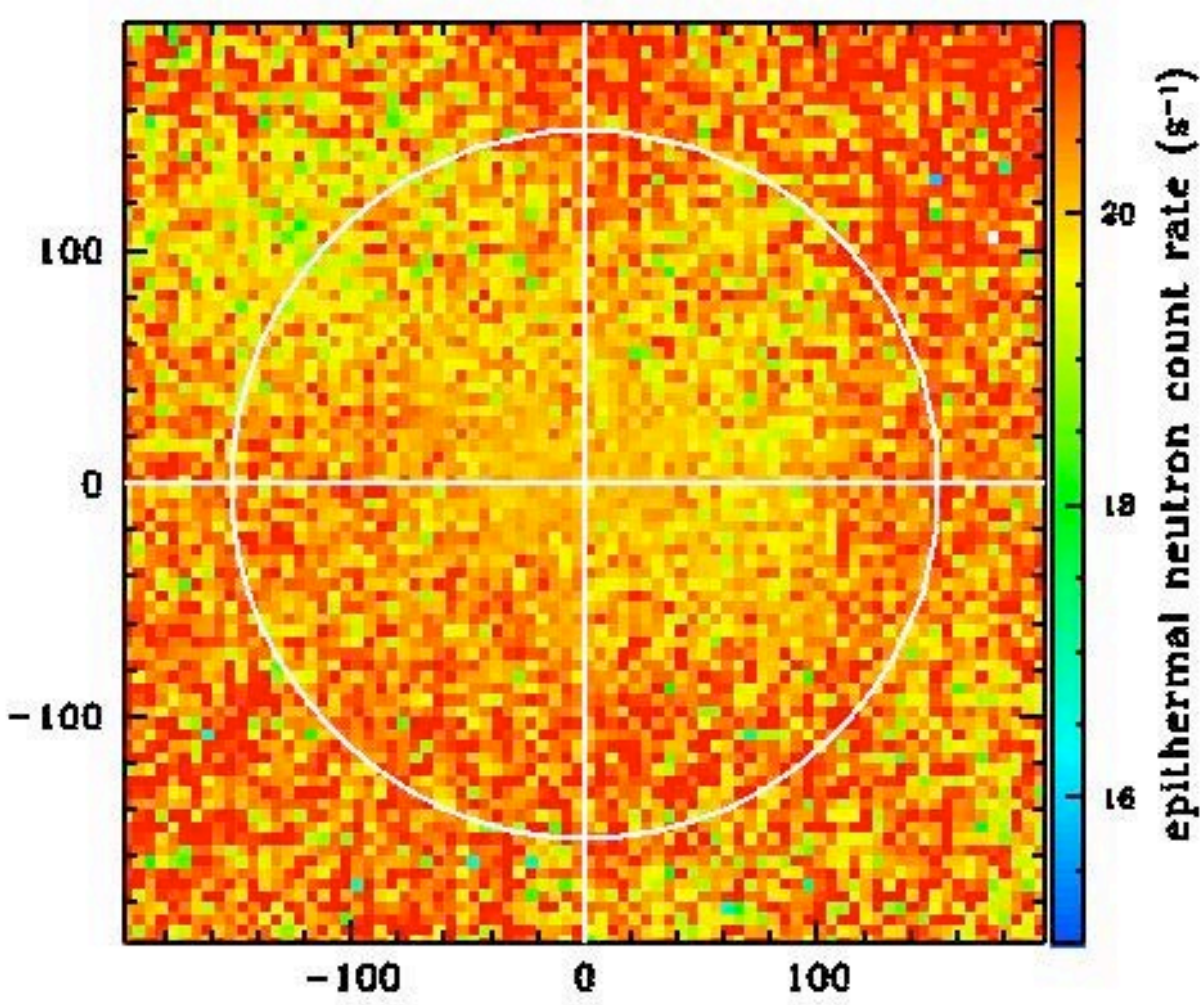
What goes into a measurement?

Add in an extra ~7%
for the background
(Maurice et al, 2004)

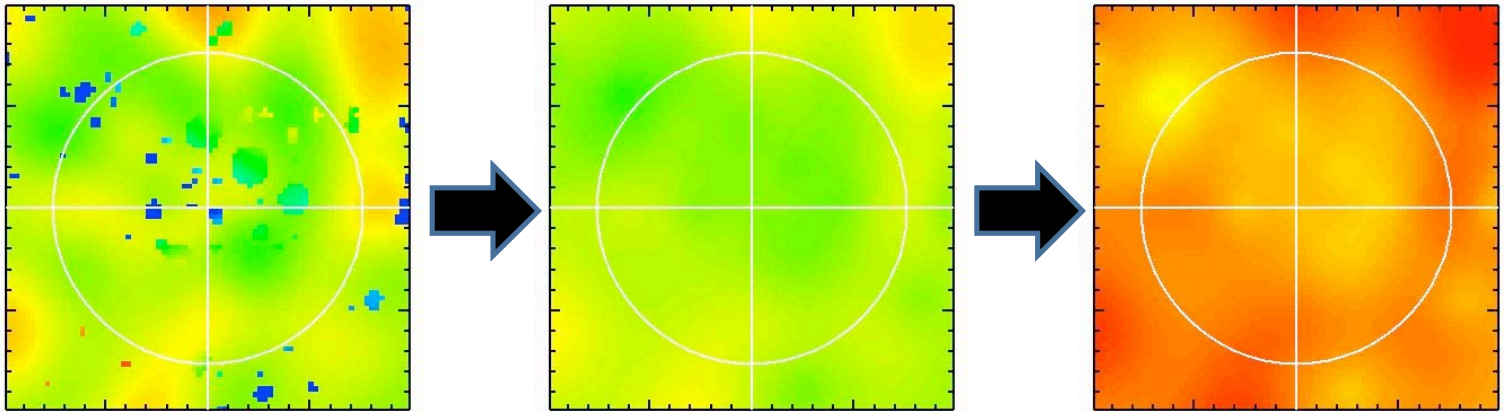


What goes into a measurement?

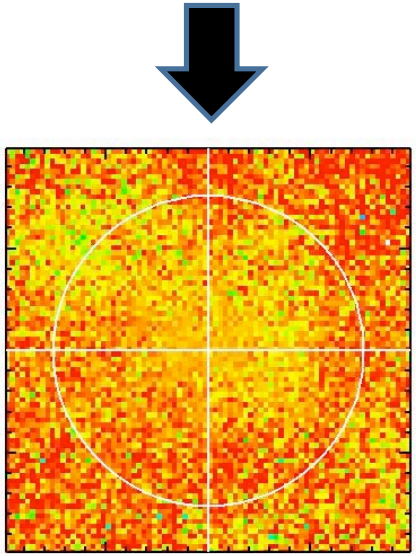
A noisy realisation



What goes into a measurement?

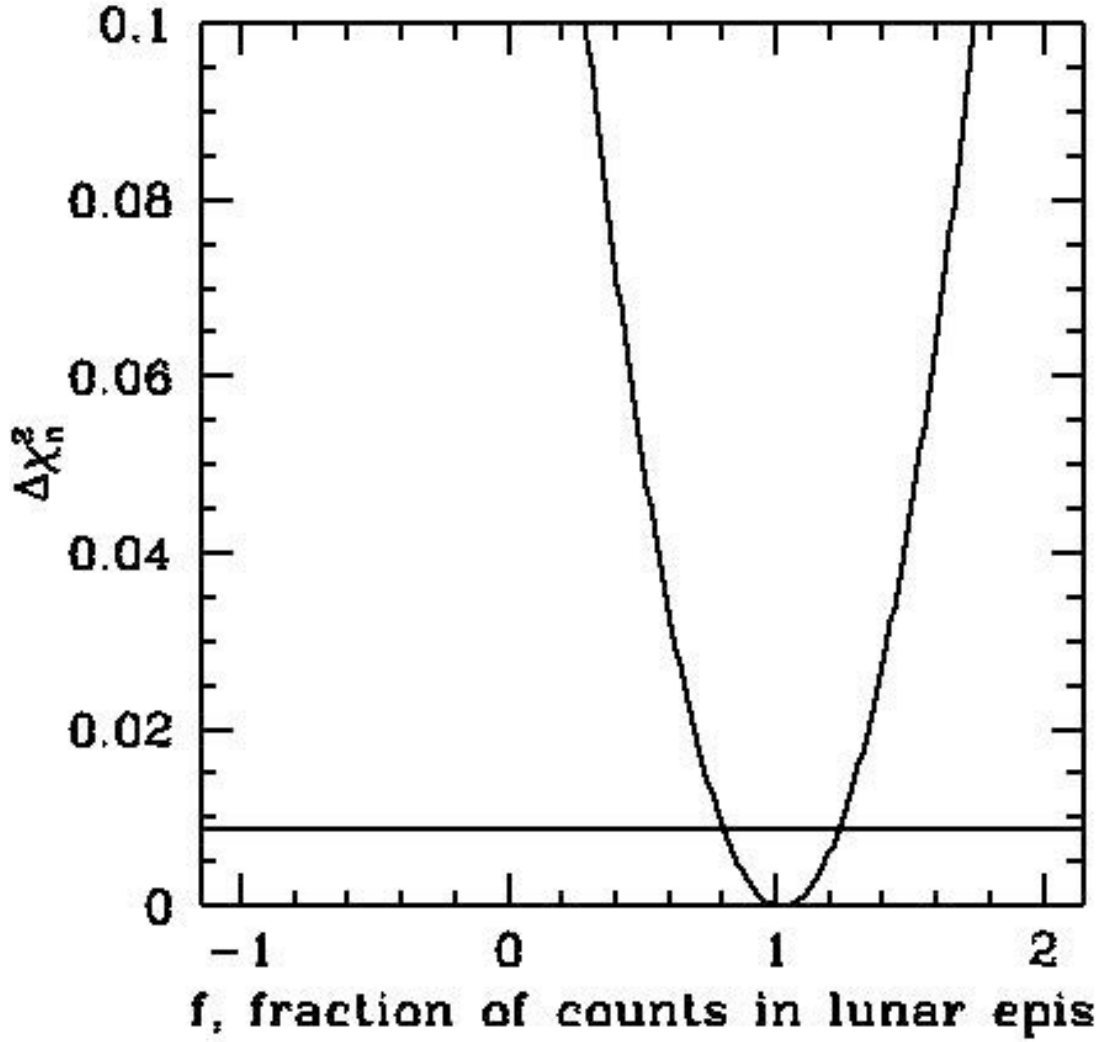


Assume this

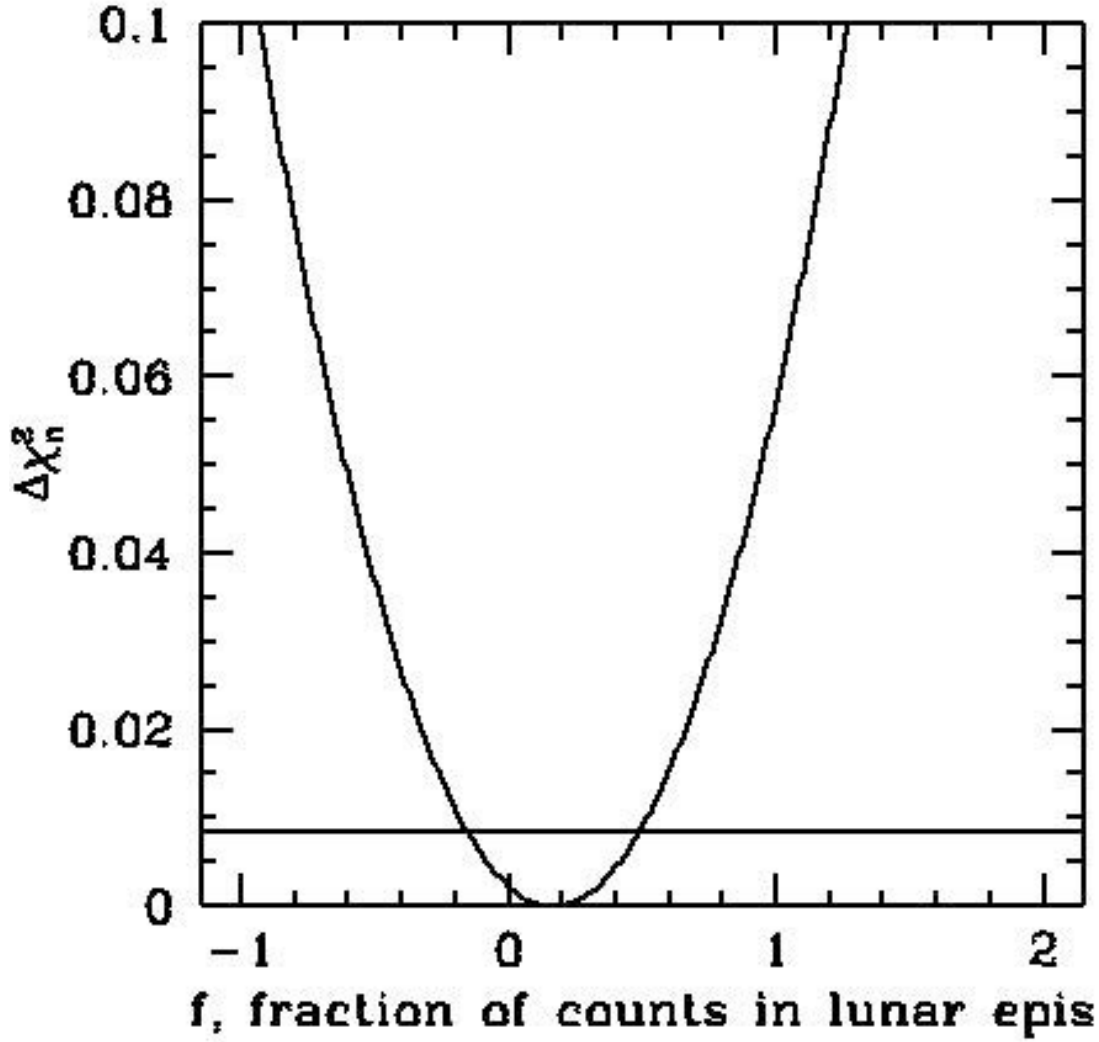


Measure this

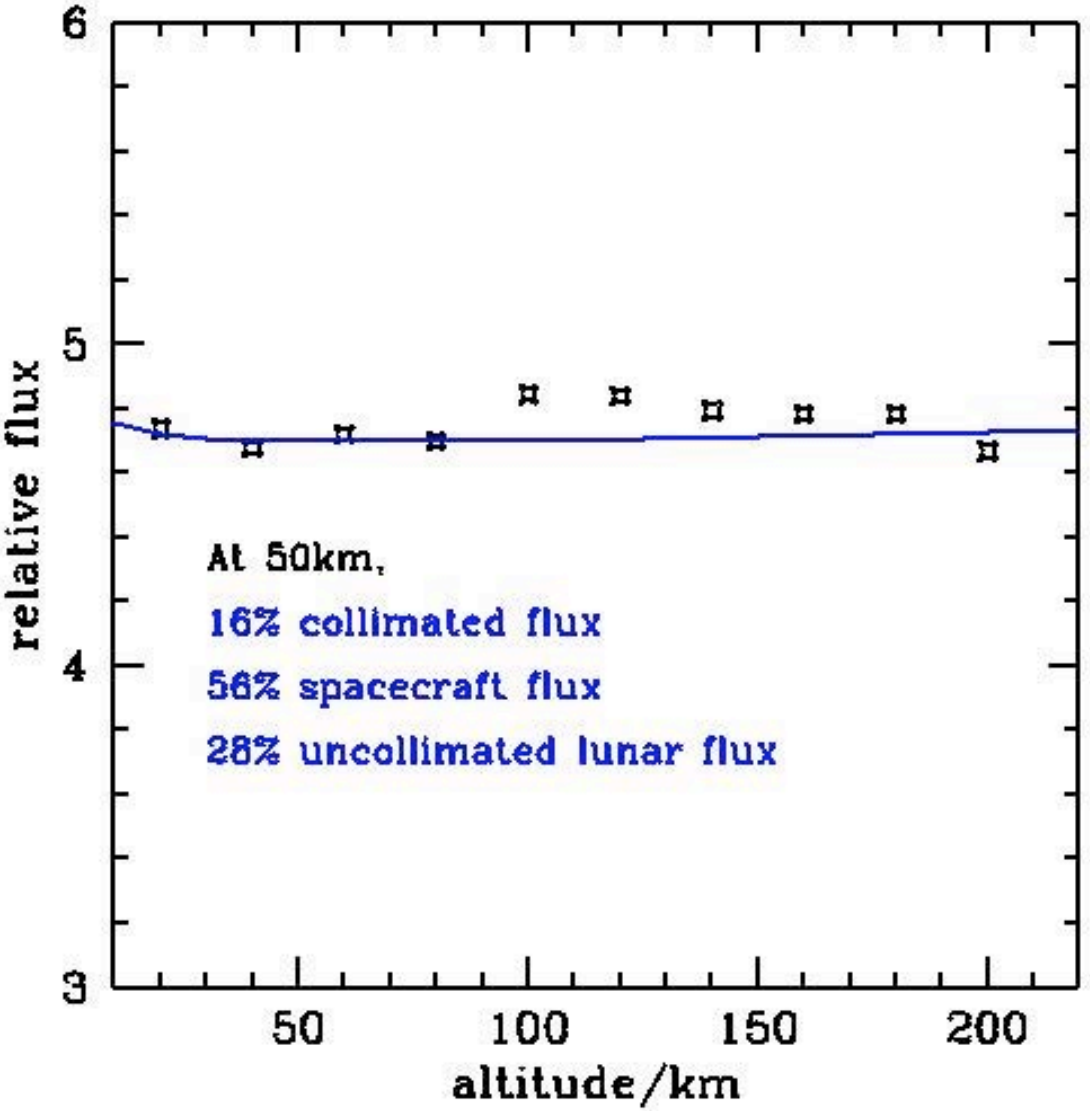
Lunar Prospector low-alt



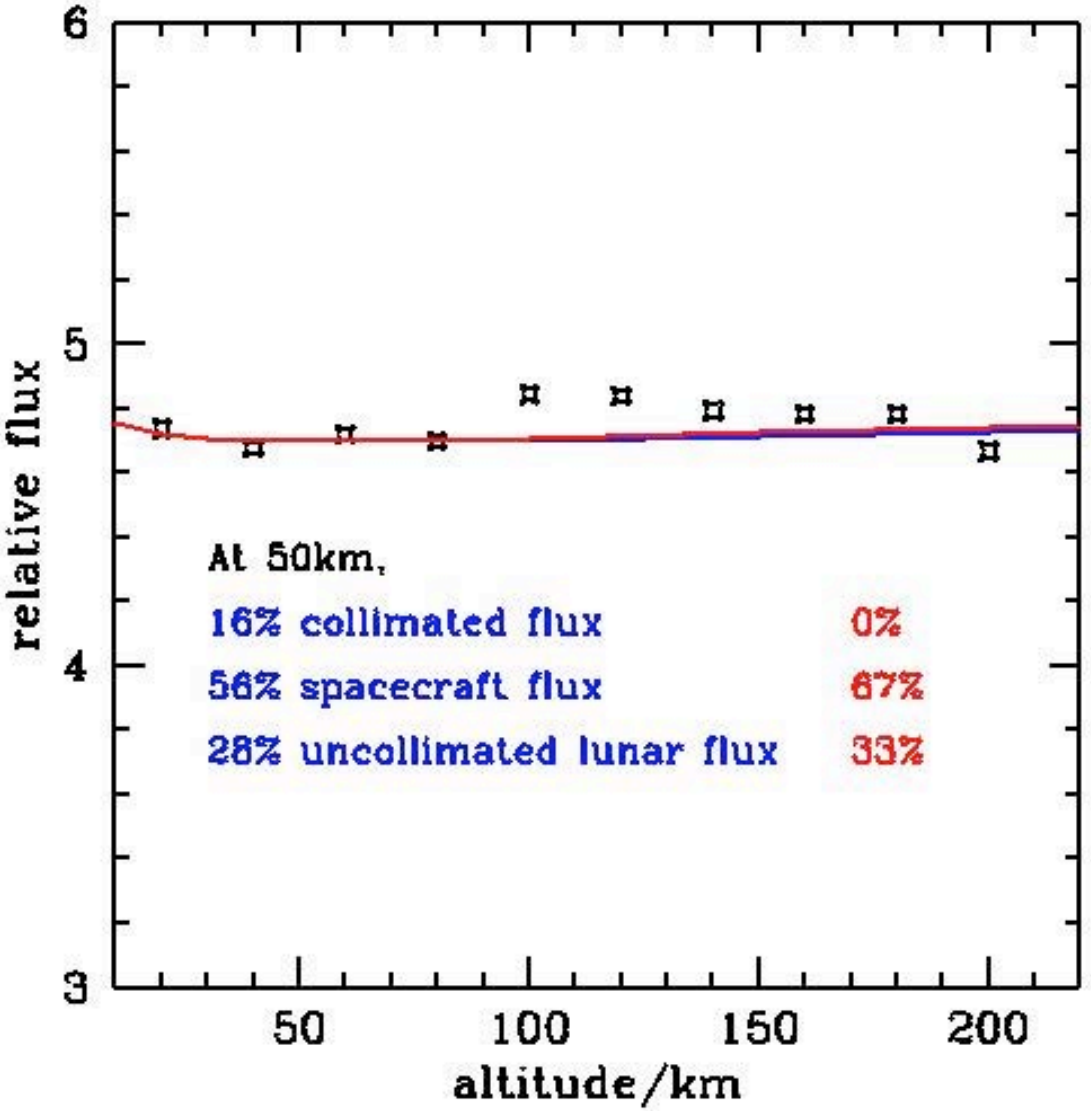
LEND CSETN


0.1
0.08
0.06
0.04
0.02
0
$\Delta\chi^2_n$
−1
0
1
2
f, fraction of counts in lunar epis

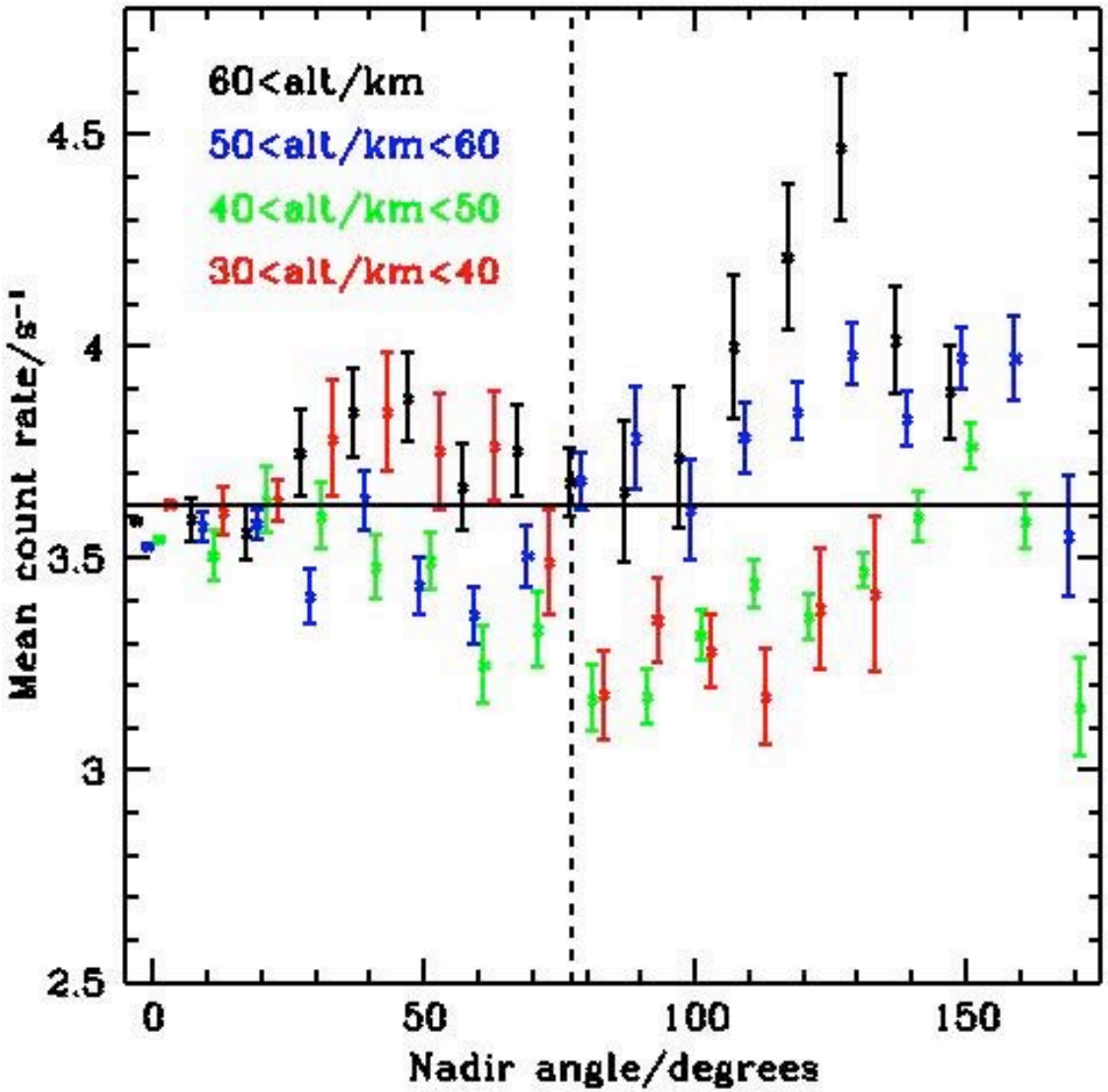
The altitude dependence of the LEND CSETN data



The altitude dependence of the LEND CSETN data



Zenith angle dependence



Conclusions

1. The publicly available LEND CSETN data do not appear to have had any background removed.
2. The LEND CSETN data appear to have only a small (best fit ~16+/-12%) admixture of lunar epithermal neutrons added to a dominant background predominantly from the spacecraft.
3. These findings are nearer to the predictions of Lawrence et al (2009, Astrobiology) than the claimed signal level of the LEND team.
4. Comparison with Lunar Prospector helps to understand the LEND CSETN data.